

Factors Affecting the Successful Implementation of E-Government on Network Documentation and Legal Information Website in Riau

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Abstract—Network documentation and legal information website is a form of e-government applications such as Jaringan Dokumentasi dan Informasi Hukum (JDIH). JDIH website must be designed to be an effective and efficient information system. This study aims to determine the success factors of the implementation of JDIH website. The DeLone and McLean model and the Unified Theory Acceptance and Use of Technology (UTAUT) are the models used in this study. The case study is conducted in the Riau legal and human rights office. Data are obtained through questionnaires from 252 respondents in the Riau provincial government and some communities. The analysis uses Structural Equation Modeling (SEM) and Analysis of Moment Structure (AMOS). The results of this study show that nine hypotheses have positive effects. Meanwhile, four hypotheses have no positive effects on the success and use of JDIH website. The findings of this research will be used as a reference in the development of JDIH website in the future.

Index Terms—Information System, DeLone and McLean Model, Unified Theory Acceptance and Use of Technology (UTAUT), E-Government

I. INTRODUCTION

GOVERNMENTS around the world are currently exploring opportunities in Information and Communication Technology (ICT). Various areas of services of the government in the world begin to introduce information and online transactions known as e-government [1]. E-government is created to improve efficiency, accessibility, and comfort for public services [2, 3]. With e-government, people can access information anywhere and anytime. The government's operational costs in providing information can be reduced by using e-government websites [4].

In Indonesia, the implementation of e-government has been developed since 2003. An example of institutions that apply e-government in Indonesia is the legal bureau of the Secretariat of the Riau provincial government. The legal bureau presents a government website to provide web service of data catalogs in the government regulations [5]. Jaringan Dokumentasi dan Informasi Hukum (JDIH) website provides legal development tools and enhances the dissemination and understanding of legal knowledge in Indonesia. JDIH (<http://jdih.riau.go.id/>) is for community and government to seek and learn about legal information in the province.

This study focuses on measuring the success of e-government systems from the perspective of their users. According to Ref. [6], it is important to know the success of e-government to plan the next necessary action. JDIH is designed to be an effective and attractive information system to be widely used by users. For that reason, it is necessary to evaluate and confirm whether the legal bureau has provided legal information services as expected, and to measure how successful the legal bureau is in providing information services to the public.

The methods used by researchers to measure the success of this JDIH website are the DeLone McLean model and Unified Theory Acceptance and Use of Technology (UTAUT) [1]. The constructed DeLone and McLean model consists of information quality, system quality, user satisfaction, and usage intention [7]. Then, UTAUT consists of social influence and perceived effectiveness. Social influence and perceived effectiveness have a strong influence on system usage [8].

Using this method, this research has succeeded in identifying the aspects affecting the success rate of the e-government website. It is hoped that this aspect can

be a solution as well as an idea to evaluate the JDIH Website to become a reliable website in disseminating legal information in Riau. The Riau legal bureau as the responsible institution for this system can take advantage of the recommendations when it considers the aspects in designing and improving the e-learning system.

II. LITERATURE REVIEW

Reference [9] identified the success factors of e-exercise using the success model of DeLone and McLean. This research showed that by increasing the trust and recognizing the information quality, system quality, and service quality, it would see the benefits of the information system. Moreover, Ref. [10] confirmed that a reliable and valid measure of e-government success consisted of cost, time, convenience, personalization, communication, ease of information retrieval, trust, and good information.

Then, Ref. [11] used DeLone and McLean Model in information systems as a basis for developing a theoretical framework for studying the role of a quality in Collaborative Information System (CIS). The impacts on the success of individuals, organizations, and projects were studied. Reference [12] proposed a framework for assessing the success of the information system by adding the cultural impact factor in Indonesia. It proved that the success of information systems could not be separated from the cultural influences. This applied especially to the rich Indonesian culture.

The success of Internet banking implementation in Indonesia was also studied [13]. It developed the DeLone and McLean model by adding usage and consumer behavior within the framework on Internet Banking. This study argued that the security of information systems was the most important factor in increasing user satisfaction and greatly affected the use of Internet banking in Indonesia.

Reference [14] described a general method designed to collect and analyze data from various literature related to e-government transformation. The implementation of e-government showed that the independent variables collected from the literature did not make e-government successful, although it was positively correlated to the method. In addition, the researchers evaluated the effect of each independent variable on the dependent variable separately. However, this way was not a logical way because those variables were very influential with other variables.

III. RESEARCH METHOD

A. Research Model and Hypothesis

This research combines two models, namely DeLone and McLean model and UTAUT. The combined model

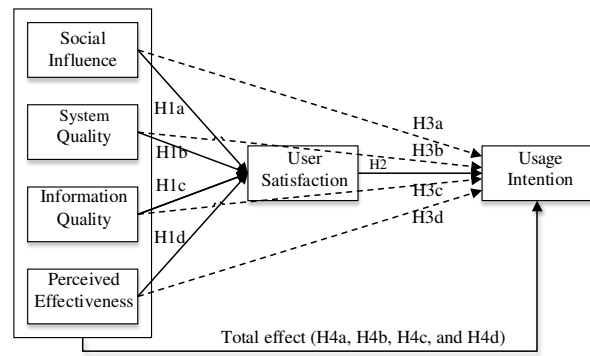


Fig. 1. Research model.

is adapted from the previous research on e-government adoption and user satisfaction [1] because it is appropriate to the context of this study. The researchers argue that e-government attributes will affect user satisfaction and the usage intention of e-government services. They observed the importance of creating satisfied users with the system and the impact of user satisfaction on the usage intention. This is in line with the idea of researchers with the same context in the study.

The DeLone and McLean models consist of information quality, system quality, user satisfaction, and usage intention constructs. Each construct should be measured separately as it will affect user satisfaction. Furthermore, the output of information systems such as accuracy, timeliness, and completeness are characteristic of information quality [15]. Information quality is evaluated by the user and will affect user satisfaction [16]. Subsequently, the social construct influence and perceived effectiveness constructs were adopted from the Unified Theory Acceptance and Use of Technology (UTAUT) model [8]. Social influence is the extent to which an individual has the belief that using a new system will minimize effort in the process of doing the job. Social factors also have a strong influence on improving the user system [17]. Figure 1 shows the overview of the proposed research model.

Governments as service providers must interact with service users for the e-government services to run. E-government can influence user attitudes and views about the government. It also affects the user trust in the effectiveness of the services built by the government [18]. In addition, usage intention and user satisfaction are also interconnected. Increase in user satisfaction will increase the usage intention [7, 19]. Quality also refers to the technical capacity of the information system such as ease of use, reliability, response time, and availability [7, 9, 19].

In addition to the direct effects, user satisfaction also

can indirectly affect the usage intention. It is possible that the relationship between attributes and usage intention is mediated by user satisfaction. User satisfaction has been widely used to measure the success and effectiveness of e-government [20, 21]. Several researchers have investigated the provided information quality, user needs, website design quality and support for end users as the contributors to user satisfaction. To test the hypothesis, the total effect of the attribute regarding the usage intention (direct and indirect effects) is needed. The study on total effects has also been described by many other researchers [22–24]. Their research provides support for the total influence of e-government attributes (social influence, information quality, and system quality, and perceived effectiveness) on usage intention of e-government services. It includes both direct and indirect effects through user satisfaction.

Based on the explanation, several hypotheses are proposed. Those are:

- H1a: Social influence has a positive effect on user satisfaction.
- H1b: System quality has a positive effect on user satisfaction.
- H1c: Information quality has a positive effect on user satisfaction.
- H1d: Perceived effectiveness has a positive effect on user satisfaction.
- H2: User satisfaction has a positive effect on usage intention.
- H3a: Social influence has a positive effect on usage intention.
- H3b: System quality will have a positive effect on usage intention.
- H3c: Information quality will have a positive effect on usage intention.
- H3d: Perceived effectiveness will have a positive effect on usage intention.
- H4a: Social influence indirectly affects the usage intention through its effect on user satisfaction.
- H4b: System quality indirectly affects the usage intention through its effect on user satisfaction.
- H4c: Information quality indirectly affects usage intention through its effect on user satisfaction.
- H4d: Perceived effectiveness indirectly affects usage intention through its effect on user satisfaction.

The case study in this research is the Riau JDIH website. The researchers use probability sampling technique. The questionnaires are distributed to the Riau provincial government office including the Regional Secretary (Sekda), the Regional Development Planning

Board (BAPPEDA), and the Inspectorate of Riau. Then, the researchers also distributed it to some communities that meet the requirement of using JDIH website. The questionnaires have 270 respondents, which 200 people from government offices and 70 people from communities. The number of respondents in this study refers to the previous study of Ref. [25]. The use of Structural Equation Modeling (SEM) requires 100–200 people as the sample size at least. From the questionnaires distributed, there are 252 respondents who become the sample in this study.

B. Sample and Data Collection

The data are collected using questionnaires based on five points of Likert scale. Five Likert scales range from 1 to 5. Those are strongly agree, agree, neutral, disagree, and strongly disagree. A total of 270 questionnaires are distributed to respondents, but only 252 questionnaires return. It has 93.3% of response rate. SEM approach and the AMOS 22 software are used to evaluate the construction model and estimate the structural relationship between latent variables simultaneously [26]. The demographics of the respondents are shown in Table I.

IV. RESULTS AND DISCUSSION

A. Measurement Model

To evaluate the validity and reliability of the construct, the researchers use Amos 22 software. According to Ref. [26], to achieve the validity of the research, the Average Variance Extracted (AVE) value must exceed the value 0.5. Moreover, the loading factor value must be greater than 0.5. Then, the value of Composite Reliability (CR) must be greater than AVE. The results of calculations from this study have shown that the AVE value of the construct is greater than the recommended value of 0.5. Then, the CR value for each varies from 0.8 to 0.9. This shows that the CR value is greater than the AVE value and exceeds the suggested value of 0.7 [26]. In addition, the alpha value of all constructs is also greater than 0.7. It identifies that the measurement model has good internal consistency and reliability (see Table II).

B. Discriminant Validity Test

The discriminant validity test measures whether two different statistical factors produce valid data [20]. It compares the square root of the AVE and the correlation factor coefficients [21]. Based on the result of validity test, system quality (SQ) has the value of 0.763, information quality (IQ) with 0.735, and perceived effectiveness (PE) with value 0.758. Moreover, user

TABLE I
RESPONDENTS DEMOGRAPHIC DATA ($N = 252$).

Description		Frequency	Percent (%)
Gender	Male	133	52.8
	Female	119	47.2
Age	Less than 24 years	71	28.2
	25–30 years	134	53.2
	31–35 years	2	0.8
	More than 36 years	45	17.9
Education level	High School	93	36.9
	Bachelor	128	50.8
Experience using JDIH Website	Master	31	12.3
	Experienced	150	98.7
	Inexperienced	2	1.32
Internet usage	Less than 1 hour	26	10.3
	2–5 hours	35	13.9
	More than 5 hours	191	75.8

TABLE II
FACTOR LOADINGS, CR, AND AVE.

Variable	Items	Factor Loadings	Component Reliability	AVE
SQ	SQ1	0.729	0.8742	0.58226
	SQ2	0.761		
	SQ3	0.805		
	SQ4	0.808		
	SQ5	0.707		
IQ	IQ1	0.760	0.8550	0.541397
	IQ2	0.741		
	IQ3	0.708		
	IQ4	0.729		
	IQ5	0.740		
PE	PE1	0.708	0.8708	0.57490
	PE2	0.711		
	PE3	0.756		
	PE4	0.797		
	PE5	0.813		
US	US1	0.874	0.9411	0.76175
	US2	0.838		
	US3	0.888		
	US4	0.885		
	US5	0.878		
UI	UI1	0.726	0.8414	0.57091
	UI2	0.801		
	UI3	0.787		
	UI4	0.704		
SI	SI1	0.708	0.8374	0.56327
	SI2	0.776		
	SI3	0.742		
	SI4	0.774		

satisfaction (US) has value 0,872, and usage intention (UI) has value 0.755. Then, social influence (SI) has a value of 0.750. The result of the validity test shows that the indicators have value more than 0.7. It means that the whole data are valid [20]. The result of discriminant validity test is shown in Table III.

C. Fit Model Criteria

To test the fit model criteria, the researchers use Confirmatory Factor Analysis (CFA). AMOS 22 identifies all proposed models. Probability value shows poor fit has a cutoff value below 0.05. The RMSEA value of 0.059 indicates good model fit. The GFI value of 0.852 shows the marginal fit, and AGFI value of 0.820

TABLE III
DISCRIMINANT VALIDITY TEST.

	SQ	IQ	PE	US	UI	SI
SQ	0.7631	0.1610	0.1960	0.2370	0.1720	0.2260
IQ	0.1610	0.7358	0.2000	0.2430	0.1840	0.2320
PE	0.1960	0.2000	0.7582	0.2670	0.2100	0.2500
US	0.2370	0.2430	0.2670	0.8728	0.2670	0.3030
UI	0.1720	0.1840	0.2100	0.2670	0.7556	0.2340
SI	0.2260	0.2320	0.2500	0.3030	0.2340	0.7505

indicates good fit [26]. Furthermore, for the value of TLI and CFI, those are 0.933 and 0.941, respectively indicating good fit [27]. The result can be seen in Table IV.

The results of the theoretical hypothesis testing

TABLE IV
GOODNESS OF FIT INDEXES.

Index	Cutoff value	Model	Status
<i>p</i> -value	≥ 0.05	0.000	Poor Fit
RMSEA	≤ 0.08	0.059	Good Fit
GFI	≥ 0.90	0.852	Marginal Fit
AGFI	≥ 0.80	0.820	Good Fit
CMIN/DF	≤ 2.00	1.861	Good Fit
TLI	≥ 0.90	0.933	Good Fit
CFI	≥ 0.90	0.941	Good Fit

TABLE V
HYPOTHESIS TEST RESULTS.

Hypothesis	<i>p</i> -value	Limit	Explanation
H1a	0.004	0.050	Effect
H1b	0.023	0.050	Effect
H1c	0.031	0.050	Effect
H1d	0.030	0.050	Effect
H2	0.000	0.050	Effect
H3a	0.036	0.050	Effect
H3b	0.506	0.050	No effect
H3c	0.697	0.050	No effect
H3d	0.024	0.050	Effect
H4a	0.302	0.207	No effect
H4b	-0.057	0.102	Effect
H4c	0.033	0.095	Effect
H4d	0.196	0.098	No effect

and the relationship between the latent constructions provided through SEM technique through AMOS 22 are shown in Table IV. It includes the coefficient and significance as well as the results of hypothesis testing.

The results of testing hypotheses are in Table V. From testing the relationship between social influence and user satisfaction variables, it shows the probability value of 0.004 ($p < 0.05$) so H1a is accepted. It has a positive effect on the user satisfaction in JDIH website. The better the social influence is, the better the user satisfaction will be. This is in line with the research by Ref. [8] stating that social influence had a positive effect on the user satisfaction. Then, in H1b, the effect of system quality on user satisfaction has a probability value of 0.023 ($p < 0.05$). It shows that system quality has a positive effect on user satisfaction in using JDIH website. It means H1b is accepted. According to Ref. [7], system quality has a strong influence on user satisfaction in the context of information systems. The influence of system quality will increase user satisfaction. The results of this study are also in line with some previous studies by Refs. [28, 29].

Information quality on user satisfaction has a probability value of 0.031 ($p < 0.05$). This shows that information quality has a positive effect on user satisfaction in using JDIH website. H1c is accepted. The information quality will increase user satisfaction [7]. This research is in line with Ref. [15] on the success of information systems using the Delone Mclean

model. Other studies also show the system quality and information quality have a positive relationship with user satisfaction [1]. Moreover, the effect of perceived effectiveness on user satisfaction has a probability value of 0.030 ($p < 0.05$) so it shows perceived effectiveness has a positive effect on user satisfaction in using JDIH website. The perceived effectiveness will increase user satisfaction. Thus, H1d is accepted.

The effect of user satisfaction on usage intention shows probability value 0.000 ($p < 0.05$). Thus, H2 is accepted. User satisfaction has a positive influence on usage intention in JDIH website. The social influence on the usage intention has a probability value of 0.036 ($p < 0.05$) so H3a is accepted. It shows social influence has a positive effect on usage intention in JDIH website. The effect of system quality on intention to use has a probability value of 0.506 ($p > 0.05$). In H3b, it shows that system quality has no positive effect on usage intention in JDIH website. For the effect of information quality on user satisfaction, it has probability value 0.697 ($p > 0.05$). Thus, H3b is rejected.

Moreover, H3c is rejected. It shows that information quality has no positive effect on usage intention. Then, the effect of perceived effectiveness on usage intention has a probability value of 0.024 ($p < 0.05$) so perceived effectiveness has a positive effect on usage intention. H3d is accepted.

Furthermore, the results also show the relationship between total effects of social influence, system quality, information quality, and perceived effectiveness on usage intention through user satisfaction directly and indirectly. The social influence on usage intention through user satisfaction has a coefficient value of the standardized direct effect. It is between social influence on usage intention that is mediated by user satisfaction. It is obtained that the value of direct value is bigger than the indirect value. In the testing the relationship between these two variables, it shows the value of $0.302 > 0.207$. This suggests that user satisfaction cannot mediate the social influence on usage intentions. Thus, H4a is rejected. Social influence does not significantly affect the usage intention through user satisfaction.

The system quality on usage intention through user satisfaction has a coefficient value of standardized direct effect between system quality and usage intention. It is mediated by user satisfaction and obtained by the direct value is smaller than the indirect value. The test shows the value of $-0.057 < 0.102$. It implies that indirect effect is greater than the direct effect. The system quality has a significant effect on usage intention through user satisfaction. H4b is accepted. According to Ref. [30], a good system quality can

affect a person's intention to reuse it.

Moreover, the effect of information quality on the usage intention through user satisfaction has the value of a coefficient of standardized direct effect. It is between information quality and usage intention mediated by user satisfaction of the direct value is less than the indirect value. The test shows the value of $0.033 < 0.095$. User satisfaction can mediate the information quality on usage intention. Information quality has a significant effect on usage intention through the user satisfaction. Thus, H4c is accepted.

The effect of perceived effectiveness on usage intention through user satisfaction has a bigger direct value than the indirect value. The test shows the value of $0.196 > 0.098$. User Satisfaction is unable to mediate the effect of perceived effectiveness on the usage intention. Hence, perceived effectiveness has no significant effect on the usage intention through the dimensions of user satisfaction. H4d is rejected. The strong relationship between system quality and information quality and usage intention through user satisfaction, as well as the weak relationship between social influence and perceived effectiveness towards the usage intention through user satisfaction, has been described by the previous researcher [1].

V. CONCLUSION

This research tries to find the success factors in applying JDIH Website in Riau legal bureau. The research shows that user satisfaction has become the most influential factor on usage intention. Social influence, quality system, information quality, and perceived effectiveness have positive effects. Social influence and perceived effectiveness can also increase the number of users because it can affect the usage intention directly. Although the quality system and information quality have no direct effect on the usage intention, it becomes an important factor to user satisfaction. It also affects the usage intention indirectly.

There are suggestions for the developers. All variables that have been proven to be important roles should be improved further. For user satisfaction, the stronger the variable is, the higher usage intention will be. Moreover, social influence and perceived effectiveness should be increased because of the direct influence on the usage intention. For example, the developers can provide socialization to the community and government in Riau.

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